

**Release Notes**

# hp StorageWorks Enterprise Virtual Array 5000

**Product Version:** 3.014

Fourth Edition (June 2004)

**Part Number:** T3030-98301



This document contains the most recent product information about the HP StorageWorks Enterprise Virtual Array 5000, as well as supplemental, support, and product feature details.

For the latest version of these Release Notes and other Enterprise storage system documentation, visit the HP storage web site at <http://h18006.www1.hp.com/storage/array systems.html>.



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Enterprise Virtual Array 5000 Release Notes  
Fourth Edition (June 2004)  
Part Number: T3030-98301

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## Introduction to this document

This section describes the following aspects of this document:

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## Intended audience for this document

This document is intended to assist customers who purchased the HP StorageWorks Enterprise Virtual Array 5000 and the associated software:

- HP StorageWorks Virtual Controller Software Package v3.014 for Dual HSV110 Controllers
- HP OpenView Storage Operations Manager, Command View EVA v3.1
- HP StorageWorks Business Copy EVA v2.2 (optional)
- HP StorageWorks Continuous Access EVA v1.1 (optional)

This document is also intended for use by HP authorized service providers responsible for installing and maintaining designated devices associated with this storage system.

## Conventions used in this document

The following conventions are used throughout this document:

- Unless otherwise specified, all references to the *Enterprise Virtual Array*, the *Enterprise storage system*, or the *storage system* refer to the Enterprise Virtual Array 5000.
- *HP StorageWorks Enterprise Virtual Array System Software* refers to the storage system software bundle containing Virtual Controller Software (VCS), Environmental Monitoring Unit (EMU) firmware, programmable component images, diagnostics, and message files. This *storage system software* is usually represented by a four-digit number (for example, v3.014). The *VCS version number* is indicated by the first two digits of the storage system software version (for example, v3.0).
- Unless otherwise specified, all references to a *controller* or *controller pair* refer to the HSV110 controller or HSV110 controller pair used in the Enterprise Virtual Array 5000.

## New features and enhancements

The Enterprise Virtual Array 5000 v3.014 provides the following new features and enhancements:

- Correction for orphaned PSEG metadata potential when deleting large LUNs
- Non-disruptive orphaned PSEG metadata repair
- Performance improvement with multiple snapclones
- Improved error handling algorithm for intermittent drive errors
- Providing CA-source ride-thru from CA-destination problems
- Correction of false critical error message on startup with Hitachi FC Drives running HP07 firmware
- Removal of benign EMU event reporting by down-rev EMUs
- Improvement in EMU report of lost communications, allowing for retries

## Where to find additional Enterprise Virtual Array documentation and downloads

Additional documentation, including white papers, best practices, and switch documents, are available from the HP web site at <http://www.hp.com>.

For more information on the Enterprise Virtual Array, visit <http://h18006.www1.hp.com/storage/arrayssystems.html>.

To access the latest version of Enterprise Virtual Array technical documentation, visit <http://h18000.www1.hp.com/products/storageworks/enterprise/documentation.html>.

To access HP OpenView Storage Operations Manager, Command View EVA documentation, visit <http://h18006.www1.hp.com/products/sanworks/managementappliance/documentation.html>.

For information on HP StorageWorks Business Copy EVA, visit <http://h18006.www1.hp.com/products/storage/software/bizcopyeva/index.html>.

For information on HP StorageWorks Continuous Access EVA, visit <http://h18006.www1.hp.com/products/storage/software/conaccesseva/index.html>.

For downloadable software and drivers for storage products, visit <http://welcome.hp.com/country/us/eng/support.html>.

To download Storage Management Appliance updates, visit <http://h18000.www1.hp.com/products/sanworks/managementappliance>. You can access the latest update by selecting Software & Drivers.

To access the latest version of Storage Management Appliance technical documentation, visit <http://h18006.www1.hp.com/products/sanworks/managementappliance/documentation.html>.

To access Enterprise Virtual Array product support, visit <http://h18000.www1.hp.com/products/storageworks/enterprise>.

To redeem a license key, visit <http://h18000.www1.hp.com/products/software/softwarekeys/index.html>.

To download operating system platform kits, visit <http://www.hp.com/go/evaplatformkit>.

## Enterprise Virtual Array 5000 storage system

Topics in this section include:

- [Enterprise Virtual Array 5000 storage system description](#), page 8
- [Enterprise Virtual Array system software](#), page 8
- [Kit description](#), page 11
- [Upgrading an Existing Enterprise Virtual Array System to VCS v3.014](#), page 12
- [Licensing information](#), page 12

## Enterprise Virtual Array 5000 storage system description

The Enterprise Virtual Array 5000 is an ultra high-performance, high-capacity, and high-availability, VersaStor-enabled, virtual RAID (Vraid) storage solution. This storage system consists of the following components:

- A pair of HSV110 controllers and their Virtual Controller Software (VCS).
- An array of physical disk drives that the controller pair controls. The disk drives are located in drive enclosures that house the associated physical, electrical, and environmental systems for the disk drives.
- HP OpenView Storage Management Appliance, switches, and cabling (purchased separately).
- HP OpenView Storage Operations Manager, Command View EVA: the graphical interface to the storage system. This software resides on the Storage Management Appliance and is accessed through your browser.

The Enterprise Virtual Array connects to a fabric containing your host servers, switches, cabling, and other infrastructure.

## Enterprise Virtual Array system software

The *HP StorageWorks Enterprise Virtual Array System Software* contains VCS, EMU firmware, programmable component images, diagnostics, and message files. It provides storage software capability for the HSV110 controller. It is pre-installed on the Enterprise Virtual Array 5000 and is provided in the VCS v3.014 software kit.

[Table 1](#) lists the required HSV110 controller software and the optional software products available on the Enterprise Virtual Array.



**Table 1: HP StorageWorks Enterprise Virtual Array 5000 Required/Optional Software Products**

Software Product	Version	Required/Optional
VCS controller software	VCS v3.014	Required
HP OpenView Storage Management Appliance software	v2.1	Required
HP OpenView Storage Operations Manager, Command View EVA	v3.1	Required
HP StorageWorks Business Copy EVA	v2.2	Required for users wanting snapshot capability. Optional for all others.
HP StorageWorks Continuous Access EVA	v1.1	Required for users wanting remote mirroring. Optional for all others.

This section provides a brief overview of the software elements in the Enterprise Virtual Array, including:

- [VCS controller software](#), page 9
- [HP OpenView Storage Management Appliance software](#), page 10
- [HP OpenView Storage Operations Manager, Command View EVA](#), page 10
- [HP StorageWorks Business Copy EVA software](#), page 10
- [HP StorageWorks Continuous Access EVA software](#), page 11

## VCS controller software

VCS v3.014 provides storage controller software capability for the dual-redundant HSV110 controllers. VCS v3.014 is pre-installed on the Enterprise Virtual Array 5000 and is provided in the VCS Media Kit, v3.014.

## HP OpenView Storage Management Appliance software

The HP OpenView Storage Management Appliance is a dedicated system that functions as the single, central, host-independent point of management and control for the Enterprise Virtual Array, other storage devices, and SAN applications. HP OpenView Storage Management Appliance software v2.1 resides on the Storage Management Appliance to control and monitor the appliance itself and the applications installed on it, including HP OpenView Storage Operations Manager, Command View EVA.

HP OpenView Storage Operations Manager, Command View EVA v3.1 requires HP OpenView Storage Management Appliance software v2.1. This software is located on the HP OpenView Storage Management Appliance software v2.1 CD-ROM, orderable at no charge on the following web site:

<http://h18006.www1.hp.com/products/sanworks/softwaredrivers/managementappliance/index.html>.

When upgrading Command View EVA to v3.1, first upgrade to HP OpenView Storage Management Appliance software v2.1, then proceed with the Command View EVA v3.1 installation.

## HP OpenView Storage Operations Manager, Command View EVA

HP OpenView Storage Operations Manager, Command View EVA is the graphical user interface for the Enterprise Virtual Array. It resides on the HP OpenView Storage Management Appliance.

VCS v3.014 *requires* HP OpenView Storage Operations Manager, Command View EVA v3.1. This software is purchased separately as part of the HP OpenView Storage Operations Manager v1.0 product.

## HP StorageWorks Business Copy EVA software

Business Copy EVA is a local replication software product for the Enterprise Virtual Array 5000, which provides snapshot and clone setup and management. Business Copy EVA creates point-in-time copies of storage volumes, called *Business Continuity Volumes* (BCVs) using the snapshot and cloning capabilities of the array firmware and provides multi-array local mirror management.

Business Copy EVA allows you to create a clone (a complete copy of a virtual disk) or a snapshot (a fast virtual copy of a virtual disk) at any instant in time.

Business Copy EVA requires a separate license for each HSV110 controller pair. This product is licensed by the replicated capacity of the array. The Business Copy EVA license is ordered separately. Business Copy EVA upgrade licenses are required when upgrading VCS versions.

Business Copy EVA provides three types of point-in-time copy functionality:

- Virtually Capacity-Free Snapshots (Vsnaps)—these are snapshots of data that do not require pre-allocation of disk capacity equal to the snapped volume. Disk capacity is used on an as-needed basis.
- Standard Snapshots (Snapshots)—these are snapshots of data requiring pre-allocation of disk capacity equal to the snapped volume.
- Virtually Instantaneous Snapclones—these provide instantaneous data duplication through the use of the snapshot technology. You have immediate access to the duplicated data, even before creation of the clone is complete.

## HP StorageWorks Continuous Access EVA software

HP StorageWorks Continuous Access EVA is an optional solution for mirroring data online, in real time, to remote locations from a local or an extended storage area network (SAN). This functionality uses controller and management software to perform data replication at the storage system level, in the background to any host activity. See “[Expanded support for HP StorageWorks Continuous Access EVA](#)” on page 26.

VCS v3.014 expands support for HP StorageWorks Continuous Access EVA on the Enterprise Virtual Array 5000. Continuous Access EVA includes a user interface, which resides on the Storage Management Appliance. A separate Continuous Access EVA license, based on replicated storage capacity, is required. Refer to the *HP StorageWorks Continuous Access EVA QuickSpecs* at <http://h18006.www1.hp.com/products/storage/software/conaccesseva/specifications.html> for details on licensing.

## Kit description

The HP StorageWorks VCS v3.014 media kit contains the following items:

- *HP StorageWorks Enterprise Virtual Array Release Notes*
- *HP StorageWorks Enterprise Virtual Array Read Me First* card
- VCS Upgrade User License Agreement

- CD-ROMs containing VCS v3.014 software and documentation (for convenience in upgrading, VCS v2.006 and v3.001 are also included on this CD-ROM)

HP OpenView Storage Operations Manager, Command View EVA is purchased separately but is *required* for EVA5000 systems running VCS v3.014 to function.

Host operating system platform kits must be upgraded, after v3.014 is installed. The platform kits are no longer sold, and are available for download, at no charge, from the following web site: <http://www.hp.com/go/evaplatformkit>

## Upgrading an Existing Enterprise Virtual Array System to VCS v3.014

VCS v3.014 is pre-installed on a new Enterprise Virtual Array system. A copy of this software is provided on the CD-ROM in the HP StorageWorks VCS v3.0b media kit.

Upgrading to VCS v3.014 is mandatory. Refer to *hp StorageWorks Enterprise Virtual Array Updating Product Software Instructions v3.014* for complete upgrading instructions and sequences for v3.014 and associated software applications.

## Licensing information

VCS v3.014 requires installation of new licenses as follows:

- Controller software VCS v3.014 does not require a basic license, but a VCS Upgrade User License Agreement is included in the VCS software kit. No action is required to activate the agreement.
- HP OpenView Storage Operations Manager, Command View EVA is licensed separately. Acceptance of the license agreement displayed during installation is the only licensing requirement for Command View EVA.
- The Business Copy EVA license is used to activate the snapshot functionality in the VCS software. Business Copy EVA must be installed for users to be able to use the snapshot functionality. Licenses purchased for VCS v3.0 will work with v3.014. For licensing information, refer to the *QuickSpecs HP StorageWorks Business Copy EVA* at <http://h18006.www1.hp.com/products/storage/software/bizcopyeva/specifications.html>.

- Continuous Access EVA requires a license. Licenses purchased for VCS v3.0 will work with v3.014. For licensing information refer to the *HP StorageWorks Continuous Access EVA QuickSpecs* at <http://h18006.www1.hp.com/products/storage/software/conaccesseva/specifications.html>.

If you have trouble obtaining a License Key or need other licensing support information, refer to the *HP StorageWorks Enterprise Virtual Array License Instructions v3.0*, available at <http://h18000.www1.hp.com/products/storageworks/enterprise/documentation.html>.

For assistance with an incorrect Authorization ID, contact an HP authorized service provider.

For assistance with a lost Authorization ID or missing Authorization ID, contact your HP order channel.

## Supported VCS v3.014 components

Topics in this section include:

- [Supported configurations](#), page 14
- [Supported operating systems](#), page 14
- [Supported servers](#), page 23
- [Recommended browsers and Java™ Runtime Environments](#), page 24
- [Supported browsers](#), page 25

## Supported configurations

Refer to the *HP StorageWorks Enterprise Virtual Array 5000 QuickSpecs* for supported configurations. The QuickSpecs are available from the HP web site at <http://h18000.www1.hp.com/products/storageworks/enterprise/specifications.html>.

## Supported operating systems

Topics in this section include:

- [Operating system specifications](#), page 14
- [Multipathing support](#), page 20
- [Singlepathing support](#), page 22

## Operating system specifications

[Table 2](#), on page 13, lists the specifications of the operating systems that are compatible with the Enterprise Virtual Array. For a list of the Operating System Solution Kits for VCS v3.014, refer to the *HP StorageWorks Enterprise Virtual Array 5000 QuickSpecs*, available on the HP web site at <http://h18000.www1.hp.com/products/storageworks/enterprise/specifications.html>.

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**Note:** [Table 2](#), on page 13, contains current minimum level operating system specifications at the time of Enterprise Virtual Array VCS v3.014 release. In this table, *NA* means *Not Applicable*. Some operating system component versions may change due to revision. For the latest version information, visit <http://www.hp.com>.

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**Table 2: Supported operating system specifications**

Operating System	OS Version	HBA (FCA)	Adapter Firmware	Adapter Driver	Operating System
Windows NT® (Intel®)  and  Windows® 2000 (32-bit)  Windows Server 2003, Enterprise Edition (32 bit)	4.0 SP6a  5.0 SP2, SP3, SP4	LP8000 LP952 (FCA2101)	382a1 BIOS 1.60a5	4.81a9 or 4.82a9	Windows NT® (Intel®)  and  Windows® 2000 (32-bit)  Windows Server 2003, Enterprise Edition <sup>2</sup> (32 bit)
			382a1 BIOS1.61A2  391A1 BIOS163A1	4.82A14  4.82A16	
		LP9002DC	3.82a1 BIOS 1.61a2  3.91a1 BIOS 1.63a1	4.82a9 4.82a14 4.8216	
		QLA2340 BL20P Mezzanine card <sup>3</sup>	1.33 1.34	8.2.0.73 8.2.0.73	
		QLA2342 BL20P Mezzanine card <sup>2</sup>	1.33 1.34	8.2.0.73 8.2.0.73	
		LP982 <sup>2</sup>	1.01a2	4.82a16	
		LP9802 and 9802DC <sup>2</sup>	1.01a2	4.82a16	
Windows Server 2003 Enterprise Edition (64-bit) and Datacenter (64-bit)		LP9802	1.01a2	6-5.00a 11	Windows Server 2003 Enterprise Edition (64-bit) and Datacenter (64-bit)

**Table 2: Supported operating system specifications (Continued)**

Operating System	OS Version	HBA (FCA)	Adapter Firmware	Adapter Driver	Operating System
HP-UX	11.0, 11.i, 11.23 (64-bit)	A5158A 1 Gb PCI (11.0 and 11i) A6685A 1 Gb HSC (11.0 and 11i) A6795A 2 Gb PCI (All) A6826A 2 Gb (11i) A9782A 2 Gb (11i) A9784A 2 Gb	Native		HP-UX
Tru64 UNIX®	5.1 BL20 PK6 5.1a BL21 PK5 5.1b BL22 PK2	LP8000	3.91a1,	Native	Tru64 UNIX®
		LP9002 (FCA2354)	3.91a1,		
		LP9802 (FCA2384)	1.00x8		
OpenVMS	7.2-2 VMS722_FIBRE_SCSI-V0400	LP8000	3.91a1, cd3.81a4	Native	OpenVMS
		LP9002 (FCA2354)			
	LP9802 (FCA2384)	1.00x8			
	7.3 <sup>1</sup> 7.3-1 VMS73_FIBRE_SCSI-V0500 (for 7.3), VMS7.3-1_UPDATE-V0200 (for 7.3-1) VMS 7.3-2	LP8000	3.91a1		
LP9002 (FCA2354)					
		LP9802 (FCA2384)	1.00x8		



**Table 2: Supported operating system specifications (Continued)**

Operating System	OS Version	HBA (FCA)	Adapter Firmware	Adapter Driver	Operating System
Sun Solaris	2.6, 7, 8	JNI FCI-1063 (32-bit PCI)	3.0.3	2.5.9-03	Sun Solaris
		JNI FC64-1063 (64-bit Sbus)	13.3.7		
		QLA2310 PCI 2 Gb (FCA2257P)	FC 1.18.5/3.1.2	3.26 4.11	
		QLA2202 Sbus 1Gb (FCA2257S)	FC 1.18.3/2.2.1		
		QLA2202 cPCI 1Gb <sup>4</sup> (FCA2257C)	FC 1.18.5/3.1.2		
	9 Build 2	QLA2310 PCI 2 Gb (FCA2257P)	FC 1.18.5/3.1.2	3.26 4.11	
		QLA2202 Sbus 1Gb (FCA2257S)	FC 1.18.3/2.2.1		
		QLA2202 cPCI 1Gb (FCA2257C)	FC 1.18.5/3.1.2		

**Table 2: Supported operating system specifications (Continued)**

Operating System	OS Version	HBA (FCA)	Adapter Firmware	Adapter Driver	Operating System
Linux	Red Hat AS 2.1 (2.4.9-e.3, 2.4.9-e.12, 2.4.9-e3SMP, & 2.4.9-e12SMP) U2 2.4.9-e.25SMP (32-bit) Red Hat AS 3.0 U1 (32 and 64 bit)	QLA 2340 (FCA2214) QLA 2342 (FCA2214DC) BL20P Mezzanine card	BIOS 1.33  1.34	6.04.00, 6.04.01 (native)	Linux
	SuSE SLES 7 (2.4.7-4GB, 2.4.18-4GB, 2.4.7-64GB-SMP, 2.4.18--64GB - SMP) 32-bit SuSE SLES8 SP2a/United Linux 1.0 (32-bit)				
IBM-AIX	4.3.3, 5.1, 5.2	Cambex 1 Gb PCI	2.01.19, 2.01.38	1.5.22.0 1.5.25.1 (multi-path)	IBM-AIX
		Cambex 2 Gb PCI	3.02.10	1.5.22.0 1.5.25.1 (multi-path)	
Novell NetWare	5.1 SP6, 6.0 SP3, 6.5	QLA 2340 (FCA2210)	1.29 1.34	6.50.s 6.50.y	Novell NetWare

1. This platform is not supported in Enterprise storage system configurations with Continuous Access EVA.
2. This platform is not supported in Enterprise storage system configurations with Continuous Access EVA.
3. Not supported on NT
4. QLA cPCI 1 Gb adapter (FCA2257C) is not supported by VCS v3.014 on Solaris 2.6 and 7.

Table 3 shows the clustering applications and cluster node sizes supported by VCS v3.014. In the table, SP=Single Path, MP=Multipath.

**Table 3: Clustering support**

Operating System	Cluster Service	Number of Cluster Nodes SP = single path MP = multipath
Windows NT (SP6); Windows 2000 SP2, 3, 4 (32-bit); Windows Server 2003, Enterprise Edition (32-bit)	MSCS, Oracle 9iRAC	SP - no support MP - 2-node (NT, W2K) MP - 8-node (WS2003)
Windows Server 2003 Enterprise Edition(64-bit); Datacenter (64-bit)	MSCS, Oracle 9iRAC	SP - no support
HP-UX 11.0, 11i, 11.23 (64-bit)	ServiceGuard 11.14, ServiceGuard 11.15	SP - no support MP - 4-node
Tru64 UNIX 5.1 BL20 (Patch Kit 6) 5.1a BL21 (Patch Kit 5) 5.1b BL22 (Patch Kit 2)	TruCluster	Max = 8 SP - no support MP - 8-node
OpenVMS7.2-2, 7.3, 7.3-1, 7.3-2	VMS Cluster	Max = 96 SP - no support MP - test with 8-node
Sun Solaris 2.6, 7, 8	SunCluster v2.2, VERITAS Foundation Suite v2.0, VERITAS Foundation Suite v3.5 (SunCluster v2.2 and VFS v3.5 not supported for v2.6)	Max = 32-node (VERITAS) SP - no support MP - 4-node
Sun Solaris 9 Build2	VERITAS Foundation Suite v2.0, VERITAS Foundation Suite 3.5 SunCluster v3.1	Max = 32-node (VERITAS) SP - no support MP - 4-node

Operating System	Cluster Service	Number of Cluster Nodes SP = single path MP = multipath
Linux Red Hat AS2.1 (2.4.9-e3, 2.4.9-e12, 2.4.9-e3smp, 2.4.9-e12smp) +U2 2.4.9-e25smp (32-bit)	Lifekeeper v4.2 Lifekeeper v4.3	SP - 16-node MP - 2-node MP - 8-node
Linux Red Hat AS 3.0 U1 (32 and 64 bit)	ServiceGuard 11.14.02	SP - test with 4-node - support 16-node MP - 4-node
Suse SLES7 (2.4.7-4GB, 2.4.18-4GB, 2.4.7-64GB-SMP, 2.4.18-64GB-SMP) (32-bit)	ServiceGuard 11.15.01	SP - test with 4-node - support 16-node MP - 8-node
Suse SLES8 SP2a/United Linux 1.0 (32-bit)	Oracle 9iRAC (U2 only)	N/A
Linux Redhat AS2.1 U2 (64-bit) Suse SLES8/United Linux 1.0 (64-bit)	ServiceGuard 11.15.01	SP - 16-node MP - 4- or 8-node
IBM AIX	HACMP 4.4.1, HACMP 4.5	SP - no support MP - 2-node

## Multipathing support

Multipathing refers to the use of multiple host bus adapters (HBAs) in a server for high availability. HP StorageWorks Secure Path provides multipathing capability for host systems running Windows, HP-UX, Sun Solaris, Linux, IBM-AIX, and NetWare. [Table 4](#) lists the versions of Secure Path for multipathing support in these operating systems.

Secure Path documentation is located at the following URL:

<http://h18006.www1.hp.com/products/sanworks/secure-path/documentation.html>.

HP OpenVMS and HP Tru64 UNIX contain integrated multipathing capability; no additional software is needed for multipathing capability in these operating systems.

**Table 4: Secure Path versions for supported operating systems**

Operating system <sup>1</sup>	In configurations with	Secure Path Version for use in configurations without Continuous Access EVA	Secure Path Version for use in configurations with Continuous Access EVA
Windows NT (Intel), Windows 2000 (32-bit), and Windows Server 2003 Enterprise Edition (32-bit)	LP8000, LP952 (FC2101), or LP9002DC (FCA2404)	4.0b or 4.0c	4.0b or 4.0c
	QLA2340 (FCA2214) or QLA2342 (FCA2214dc)	4.0b or 4.0c	4.0b or 4.0c
	LP982 (not supported on NT)	4.0b or 4.0c	4.0b or 4.0c
	LP9802 and LP9802DC	4.0b or 4.0c	4.0b or 4.0c
Windows Server 2003 Enterprise Edition (64-bit) and Datacenter (64-bit)	LP9802	4.0c	4.0c
HP-UX	Any supported adapter/firmware/driver as shown in <a href="#">Table 2</a>	3.0c, 3.0d (3.0c required for 11.23 but does not support 11.0)	3.0c, 3.0d (3.0c required for 11.23 but does not support 11.0)
Sun Solaris	Version 2.6, 7, or 8	3.0a SP1, 3.0b, 3.0b SP1, 3.0c	3.0a SP1, 3.0b, 3.0b SP1, 3.0c
	Version 9	3.0b, 3.0b SP1, 3.0c	3.0b, 3.0b SP1, 3.0c
Linux	Any supported adapter/firmware/driver as shown in <a href="#">Table 2</a>	3.0, 3.0a	3.0, 3.0a
IBM-AIX	Adapter firmware 2.01.38 (1Gb)	2.0b, 2.0c, 2.0d SP2	2.0c, 2.0d SP2
	Adapter firmware 3.02.10 (2Gb)	2.0b, 2.0c, 2.0d SP2	2.0d SP2
Novell NetWare <sup>2</sup>	Any supported adapter/firmware/driver as shown in <a href="#">Table 2</a>	3.0c, 3.0c SP2	3.0c, 3.0c SP2

1. See [Table 2](#) for supported versions.

2. Novell NetWare clusters are limited to two servers if Secure Path is installed.

## Singlepathing support

The following platforms are supported in configurations using servers with a single host bus adapter (HBA):

- Windows 2000 and Windows NT
- Windows Server 2003, Enterprise Edition
- HP-UX
- Sun Solaris
- HP OpenVMS
- HP Tru64 UNIX
- Red Hat and SUSE Linux
- Novell NetWare

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**Note:** HP OpenVMS and HP Tru64 UNIX have built-in multipathing features that are not removable, but singlepathing is also supported.

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For more information about singlepathing, refer to the white paper titled *Single Path Implementation on the HP Enterprise Virtual Array Storage System* at <http://h18006.www1.hp.com/storage/arraywhitepapers.html>.

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**Note:** Singlepathing should not be used in mission-critical environments.

Single- pathing is not supported in Continuous Access EVA environments; hosts in a Continuous Access EVA configuration must contain multiple host bus adapters.

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## Supported servers

The servers supported are listed in [Table 5](#) and [Table 6](#).

**Table 5: Supported servers by operating system**

Operating system	Supported servers
Windows	<ul style="list-style-type: none"> <li>■ HP ProLiant servers that are compatible with the supported adapters listed in <a href="#">Table 2</a>.</li> <li>■ Other industry-standard x86 servers that are compatible with the supported adapters listed in <a href="#">Table 2</a>.</li> </ul>
HP-UX	See <a href="#">Table 6</a> .
Sun Solaris	All Sun servers using 4u architecture.
Linux	<ul style="list-style-type: none"> <li>■ HP ProLiant servers that are compatible with the supported adapters listed in <a href="#">Table 2</a>.</li> <li>■ Other industry-standard x86 servers that are compatible with the supported adapters listed in <a href="#">Table 2</a>.</li> </ul>
IBM-AIX	All IBM RS/6000 PCI-based servers, 43P, B80.
Novell NetWare	<ul style="list-style-type: none"> <li>■ HP ProLiant servers that are compatible with the supported adapters listed in <a href="#">Table 2</a>.</li> <li>■ Other industry-standard x86 servers that are compatible with the supported adapters listed in <a href="#">Table 2</a>.</li> </ul>
Tru64 UNIX and OpenVMS	<ul style="list-style-type: none"> <li>■ AS800</li> <li>■ AS4100</li> <li>■ DS10 &amp; DS15</li> <li>■ DS20L</li> <li>■ ES45</li> <li>■ GS60</li> <li>■ GS160</li> <li>■ AS1200</li> <li>■ AS8200</li> <li>■ DS20</li> <li>■ DS25</li> <li>■ ES47</li> <li>■ GS80</li> <li>■ GS320</li> <li>■ AS4000</li> <li>■ AS8400</li> <li>■ DS20E</li> <li>■ ES40</li> <li>■ ES80</li> <li>■ GS140</li> <li>■ GS1280</li> </ul>

**Table 6: Supported HP-UX servers**

Server class	Models
A-class	4xx, 5xx, rp2300, rp24xx
B-class	B2000, B2600
C-class	C3000, C3650, C3700
J-class	J5600, J6000, J6700
K-class (64-bit only)	Kx60, Kx70, Kx80
L-class	1000, 2000, rp5430, rp5450, rp5470
N-class	4000, rp7400, rp7410
V-class	V2200, V2250, V2500, V2600
—	rp8400, rx16000, rp8420, rp7420, rp4440, rp3440, Orca
—	Superdome (16-, 32-, and 64-way)
IA64	rx2000, rx2600, rx5670 servers; and zx2000 and zx6000 workstations with McKinley processors

## Recommended browsers and Java™ Runtime Environments

Table 7 lists the recommended browsers for running Storage Management Appliance software v2.1 and Command View EVA v3.1.

**Table 7: Recommended Browsers and JREs**

Operating system	Internet browser	Java Runtime Environment (JRE)
HP-UX 11i, 11.23,	Netscape Navigator 7.0	1.4.1_02
Red Hat Linux AS 2.1 (32-bit)	Netscape Navigator 7.02	1.4.1_03
Sun Solaris™ 2.6, 7, 8, 9	Netscape Navigator 7.0	1.4.1_03
Windows® 2000 SP3	Internet Explorer 6.0 SP1	1.4.1_03
Windows NT® v4.0 SP6a	Internet Explorer 6.0 SP1	1.4.1_03
Windows Server 2003 (IA32 and IA64)	Internet Explorer 6.0 v6.00.3790.000	1.4.1_03



## Supported browsers

Table 8 lists the browsers and their minimum revision levels supported by the Enterprise Virtual Array. In this table, *NA* means *Not Applicable*.

**Table 8: Supported Browsers**

Operating system	Internet browser	Java Runtime Environment (JRE)
HP-UX 11i, 11.23,	Netscape Navigator 7.0	1.4.1_02
Red Hat Linux AS 2.1 (32-bit)	Netscape Navigator 7.02	1.4.1_03
Sun Solaris™ 8, 9	Netscape Navigator 7.0	1.4.1_03
Windows® 2000 SP3	Internet Explorer 6.0 SP1	1.4.1_03
Windows NT® v4.0 SP6a	Internet Explorer 6.0 SP1	1.4.1_03
Windows Server 2003 (IA32)	Internet Explorer 6.0 v6.00.3790.000	1.4.1_03

## VCS v3.014 enhancements and changes

This section describes enhancements and changes in VCS v3.014.

Topics in this section include:

- [Expanded support for HP StorageWorks Continuous Access EVA](#), page 26
- [Expanded operating system support](#), page 26
- [Proactive remote services enhancement for VCS v3.014](#), page 27
- [Enhanced EVA5000 warranty](#), page 27

### Expanded support for HP StorageWorks Continuous Access EVA

VCS v3.014 provides expanded support for Continuous Access EVA, including:

- 128 copy sets
- 128 DR Groups
- Asynchronous replication
- Multiple relationships.

Documentation related to Continuous Access EVA is available on the HP web site at <http://h18006.www1.hp.com/products/storage/software/conaccesseva/index.html>.

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**Note:** HP StorageWorks Continuous Access EVA requires a separate license. Refer to the *HP StorageWorks Continuous Access EVA QuickSpecs* at <http://h18006.www1.hp.com/products/storage/software/conaccesseva/specifications.html> for details on licensing.

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### Expanded operating system support

VCS v3.014 introduces support for additional operating systems. See “[Supported operating systems](#)” on page 14 for details.

## Proactive remote services enhancement for VCS v3.014

Proactive Remote Services now supports the Enterprise Virtual Array 5000 with VCS v3.014 in the Web-Based Enterprise Services System Event Analyzer (WEBES-SEA) V4.2. The System Event Analyzer (SEA) is a fault analysis utility. It provides basic analysis for single and multiple error/fault events, as well as complex analysis and corrective action recommendations, using analysis rules. Problem reports generated by SEA are distributed as defined by the customer's notification scheme.

For operating constraints with WEBES-SEA V4.2 and VCS v3.014, see [“Support for proactive remote services”](#) on page 28.

## Enhanced EVA5000 warranty

The EVA5000 now comes with Foundation Service Solution, which provides:

- Installation and startup service, including service planning, service deployment, and installation verification testing
- Three years of 24X7 onsite support with 4-hour response time
- Three years of 24X7 telephone support with a 2-hour response time
- VCS upgrade services

## Operating constraints

This section details operating constraints specific to the Enterprise Virtual Array hardware and Enterprise Virtual Array VCS software.

Operating constraints on other aspects of the Enterprise storage system can be found as follows:

- Operating constraints specific to the HP OpenView Storage Management Appliance software v2.1 can be found in the *HP OpenView Storage Management Appliance Software v2.1 Release Notes*.
- Operating constraints specific to HP OpenView Storage Operations Manager, Command View EVA can be found in the *HP StorageWorks Command View EVA v3.1 Release Notes*.
- Operating constraints specific to HP StorageWorks Continuous Access EVA can be found in the *HP StorageWorks Continuous Access EVA v1.1 Release Notes*.
- Operating constraints specific to HP StorageWorks Business Copy EVA can be found in the *HP StorageWorks Business Copy EVA v2.2 Release Notes*.

In addition, any operating constraints pertaining to the host operating system can be found in the individual operating system release notes.

Topics in this section include:

- [Support for proactive remote services](#), page 28
- [Space allocation limits](#), page 29
- [Sun users with Qlogic Host Bus Adapters \(HBAs\)](#), page 29

## Support for proactive remote services

Customers who are adding new Enterprise Virtual Arrays for the first time should contact their HP authorized service representative for more information on proactive event notification in their area.

Customers with Proactive Remote Services require the use of Web-Based Enterprise Services System Event Analyzer (WEBES-SEA) v4.3 with VCS v3.014. The WEBES-SEA v4.3 will be available shortly after release of VCS v3.014.

Customers with Instant Support Enterprise Edition installations are currently running the Event View EVA diagnostic and monitoring utility connected to the Instant Support Enterprise Edition (ISEE) monitoring center.

## Space allocation limits

The maximum amount of capacity that can be allocated on a single EVA5000 storage system is 32 TB. The 32 TB limit includes both presented and non-presented LUNs. If one or more allocate-on-demand snapshots are created, the necessary capacity is reserved in the system and is no longer available for allocation to other uses, even if the snapshots are not presented and they show 0 Gb allocated. If the total allocated and reserved capacity equals 32 TB, the system will not allow further capacity allocation, even though system displays indicate less than 32 TB of used space. This item will be addressed in a future VCS release.

## Sun users with Qlogic Host Bus Adapters (HBAs)

HP requires that Sun users with Qlogic HBAs running firmware v1.18 and using 2 Gb Brocade Fibre Channel switches upgrade their switch firmware to v3.1 or v4.1, depending on the switch model.

## Avoiding problem situations

This section details methods to avoid problem situations specific to the Enterprise Virtual Array hardware and Enterprise Virtual Array VCS software.

- Information on avoiding problem situations specific to the HP OpenView Storage Management Appliance can be found in the *HP OpenView Storage Management Appliance Software v2.1 Release Notes*.
- Information on avoiding problem situations specific to HP OpenView Storage Operations Manager, Command View EVA can be found in the *HP StorageWorks Command View EVA v3.1 Release Notes*.
- Information on avoiding problem situations specific to operating systems can be found in the individual operating system release notes.

Topics in this section include:

- [Operating an HSV controller at or near its storage limit](#), page 30
- [Disk Resource Pending timeout for Microsoft Windows cluster configurations](#), page 30,
- [Avoiding slow creation of multiple related snapshots](#), page 31
- [Upgrading to new operating system platform kits is required](#), page 31
- [Perform online upgrades during off-peak hours](#), page 31
- [Upgrade Business Copy EVA license to v2.2](#), page 32
- [Business Copy EVA and Continuous Access EVA upgrade](#), page 32

### Operating an HSV controller at or near its storage limit

When operating an HSV controller at or near its available storage limit, consider reducing the occupancy alarm level (set with Command View EVA) from the default of 95%. A lower alarm level provides an earlier warning that you are approaching the need to add more storage to the system.

### Disk Resource Pending timeout for Microsoft Windows cluster configurations

If the disk resource count is greater than 8, HP recommends increasing the Pending Timeout parameter for each disk resource from 180 seconds to 360 seconds. Increasing the timeout value helps maintain continuous operation of disk resources across SAN perturbations.

To view and set the Pending Timeout parameter:

1. Open the **Microsoft Cluster Administrator**.
2. Select a **Disk Group** resource in the left pane.
3. Right-click each **Disk Resource** in the right pane, one at a time, and select **Properties**.
4. Select the **Advanced** tab from the **Properties** dialog box.
5. Locate the Pending Timeout value and change it to 360.
6. Click **OK**.

## Avoiding slow creation of multiple related snapshots

Sometimes the creation of a second snapshot of the same virtual disk can take a long time. When this condition occurs, the system might seem to be hung. This condition may occur when multiple snapshots of the same virtual disk are active simultaneously. This condition typically does *not* occur when only one snapshot operation on a particular virtual disk is active.

If the slow creation of multiple snapshots of the same virtual disk is causing you a problem, a workaround is available. Refer to *How to Optimize Creation of Multiple Related Snapshots* at <http://h18006.www1.hp.com/storage/arraywhitepapers.html>.

## Upgrading to new operating system platform kits is required

There are new host platform kits for all operating systems supported by VCS v3.014. The latest platform kits are available for download at the following Web site: <http://www.hp.com/go/evaplatformkit>.

## Perform online upgrades during off-peak hours

The VCS v3.014 upgrade process requires a short period of no communication with the host and can cause application time outs to occur on high-traffic EVAs. For users doing an online upgrade, HP recommends it be done during non-peak hours with minimal applications running.

## Upgrade Business Copy EVA license to v2.2

Users holding licenses for Business Copy EVA v2.1 or earlier *must* upgrade to a Business Copy EVA v2.2 license to interface properly with VCS v3.014. Failure to upgrade to the new version can cause a loss of snapshot functionality. Refer to *HP StorageWorks Business Copy EVA Replication License Key Instructions*, included in each BC EVA license kit, for licensing procedures.

## Business Copy EVA and Continuous Access EVA upgrade

Users having Business Copy EVA v2.1 or earlier and Continuous Access EVA v1.0 must upgrade to Business Copy EVA v2.2 and Continuous Access EVA v1.1 to interface properly with VCS v3.014. This upgrade is needed because of changes to the graphical user interface.

Business Copy EVA v2.2 can be downloaded from the following Web site:  
<http://h18006.www1.hp.com/products/storage/software/softwaredrivers/bizcopyeva/index.html>

Continuous Access EVA v1.1 can be downloaded from the following Web site:  
<http://h18006.www1.hp.com/products/storage/software/softwaredrivers/conaccesseva/index.html>

Business Copy Basic Mode refers to the snapshot and snapclone features of individual StorageWorks arrays. With Basic Mode, you create and delete snapshots and snapclones using the Command View EVA interface, or an EVA host platform interface. You must acquire and install a Business Copy replication license key for each array that is to perform snapshot or snapclone operations.

You can add Enhanced Mode capabilities to your SAN by installing Business Copy server and host agent software. No additional licensing is required. Using the Enhanced Mode GUI, you can create and manage jobs that automate snapshot and snapclone operations. Enhanced Mode jobs can also interact with hosts, for example, to suspend/resume application I/O, mount/unmount volumes, and launch backup applications. Using the Enhanced Mode command line interface you can interact with jobs via host scripts.

For more information on Business Copy EVA Enhanced Mode, please visit the HP Storage web site at <http://hp.com/country/us/en/prodserv/storage.html>.



## Documentation additions

This section includes the following additions to the Enterprise Virtual Array documentation:

- [Change in document name](#), page 33
- [Failback preference behaviors and settings for HSV110 controllers](#), page 33

### Change in document name

The name of the *hp StorageWorks Enterprise Virtual Array Changing EVA Versions Instructions* document has been changed to *hp StorageWorks Enterprise Virtual Array Updating Product Software Instructions*.

This document is available on the Enterprise Virtual Array documentation web site at <http://h18000.www1.hp.com/products/storageworks/enterprise/documentation.html>.

### Failback preference behaviors and settings for HSV110 controllers

[Table 9](#) describes the behavior of each of the four available failback preference settings. [Table 10](#), on page 35, describes the default failback behavior and the preference settings allowed for each operating system supported by the Enterprise Virtual Array 5000 with VCS v3.014.

**Table 9: Behavior of failback preference settings**

Setting	Point in time	Behavior
No Preference	At initial presentation	The units are alternately brought online to Controller A or to Controller B.
	On dual boot or controller resynch	If there is cache data for a LUN on a particular controller, the unit will be brought online there. Otherwise, the units are alternately brought online to Controller A or to Controller B.
	On controller failover	All LUNs are brought online to the surviving controller.
	On controller failback	All LUNs remain on the surviving controller. There is no failback except if a host moves it using SCSI commands.

**Table 9: Behavior of failback preference settings (Continued)**

Setting	Point in time	Behavior
<b>Path A - Failover only</b>	At initial presentation	The units are brought online to Controller A.
	On dual boot or controller resynch	If there is cache data for a LUN on a particular controller, the unit will be brought online there. Otherwise, the units are brought online to Controller A.
	On controller failover	All LUNs are brought online to the surviving controller.
	On controller failback	All LUNs remain on the surviving controller. There is no failback except if a host moves it using SCSI commands.
<b>Path B - Failover Only</b>	At initial presentation	The units are brought online to Controller B.
	On dual boot or controller resynch	If there is cache data for a LUN on a particular controller, the unit will be brought online there. Otherwise, the units are brought online to Controller B.
	On controller failover	All LUNs are brought online to the surviving controller.
	On controller failback	All LUNs remain on the surviving controller. There is no failback except if a host moves it using SCSI commands.
<b>Path A - Failover/Failback</b>	At initial presentation	The units are brought online to Controller A.
	On dual boot or controller resynch	If there is cache data for a LUN on a particular controller, the unit will be brought online there. Otherwise, the units are brought online to Controller A.
	On controller failover	All LUNs are brought online to the surviving controller.
	On controller failback	All LUNs remain on the surviving controller. After controller restoration, the units that are online to Controller B and set to Path A are brought online to Controller A. This is a one-time occurrence. If the host then moves the LUN using SCSI commands, it will remain where moved.

**Table 9: Behavior of failback preference settings (Continued)**

Setting	Point in time	Behavior
<b>Path B - Failover/Failback</b>	At initial presentation	The units are brought online to Controller B.
	On dual boot or controller resynch	If there is cache data for a LUN on a particular controller, the unit will be brought online there. Otherwise, the units are brought online to Controller B.
	On controller failover	All LUNs are brought online to the surviving controller.
	On controller failback	All LUNs remain on the surviving controller. After controller restoration, the units that are online to Controller A and set to Path B are brought online to Controller B. This is a one-time occurrence. If the host then moves the LUN using SCSI commands, it will remain where moved.

**Table 10: Failback behavior and settings by operating system**

Operating system	Default behavior	Settings allowed
Windows/Secure Path	Auto failback done by the host	<ul style="list-style-type: none"> <li>■ No Preference</li> <li>■ Path A/B - Failover Only</li> </ul>
HP-UX/Secure Path	Auto failback done by the host	<ul style="list-style-type: none"> <li>■ No Preference</li> <li>■ Path A/B - Failover Only</li> </ul>
Sun Solaris/Secure Path	Auto failback done by the host	<ul style="list-style-type: none"> <li>■ No Preference</li> <li>■ Path A/B - Failover Only</li> </ul>
IBM-AIX/Secure Path	Auto failback done by the host	<ul style="list-style-type: none"> <li>■ No Preference</li> <li>■ Path A/B - Failover Only</li> </ul>
HP Tru64 UNIX	Host follows the unit	<ul style="list-style-type: none"> <li>■ All settings allowed</li> <li>■ Recommended setting: Path A/B - Failover/Failback</li> </ul>
HP OpenVMS (7.3 and below)	Attempts to move the unit to the first path discovered	<ul style="list-style-type: none"> <li>■ No Preference</li> <li>■ Path A/B - Failover Only</li> </ul>
HP OpenVMS (7.3-1 and greater)	Host follows the unit	<ul style="list-style-type: none"> <li>■ All settings allowed</li> <li>■ Recommended setting: Path A/B - Failover/Failback</li> </ul>

**Table 10: Failback behavior and settings by operating system (Continued)**

Operating system	Default behavior	Settings allowed
Linux/Secure Path	Auto failback done by the host	<ul style="list-style-type: none"><li>■ No Preference</li><li>■ Path A/B - Failover Only</li></ul>
Novell NetWare/ Secure Path	Auto failback done by the host	<ul style="list-style-type: none"><li>■ No Preference</li><li>■ Path A/B - Failover Only</li></ul>